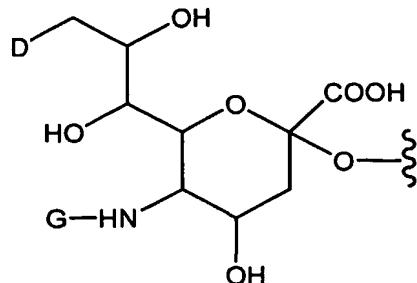


**WHAT IS CLAIMED IS:**

1 1. A Granulocyte Colony Stimulating Factor peptide comprising the moiety:

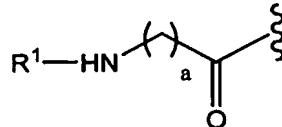


2

3       wherein

4       D is a member selected from -OH and R<sup>1</sup>-L-HN-;5       G is a member selected from R<sup>1</sup>-L- and -C(O)(C<sub>1</sub>-C<sub>6</sub>)alkyl;6       R<sup>1</sup> is a moiety comprising a member selected a moiety comprising a straight-  
7       chain or branched poly(ethylene glycol) residue; and8       L is a linker which is a member selected from a bond, substituted or  
9       unsubstituted alkyl and substituted or unsubstituted heteroalkyl,10      such that when D is OH, G is R<sup>1</sup>-L-, and when G is -C(O)(C<sub>1</sub>-C<sub>6</sub>)alkyl, D is  
11      R<sup>1</sup>-L-NH-.

1 2. The peptide according to claim 1, wherein L-R<sup>1</sup> has the formula:

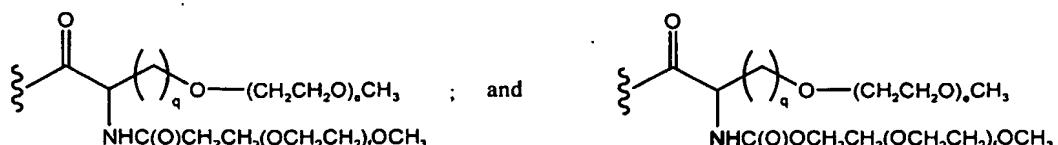
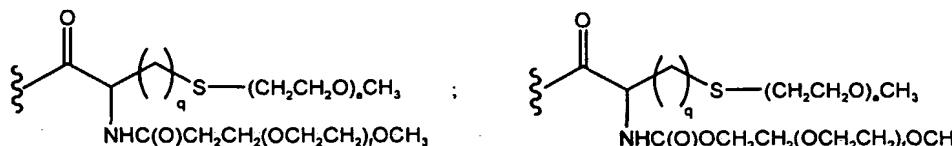


2

3       wherein

4       a is an integer from 0 to 20.

1 3. The peptide according to claim 1, wherein R<sup>1</sup> has a structure that is a member  
2       selected from:

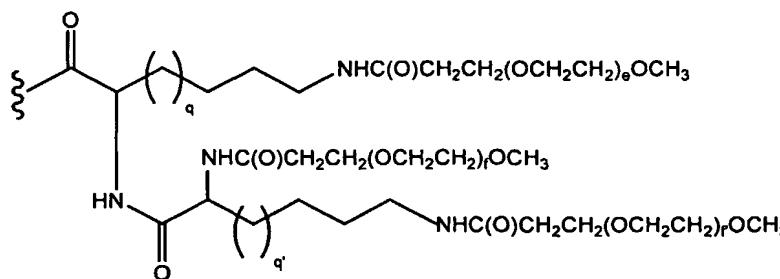
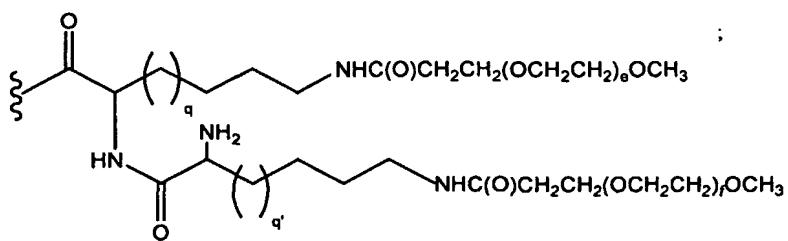
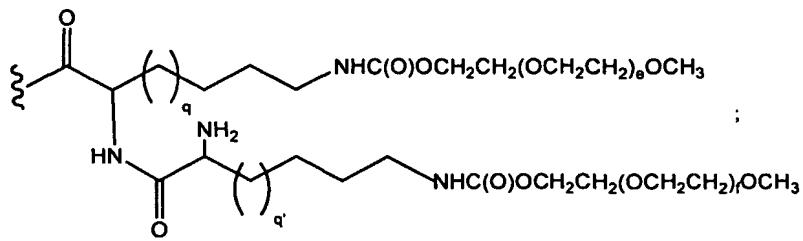


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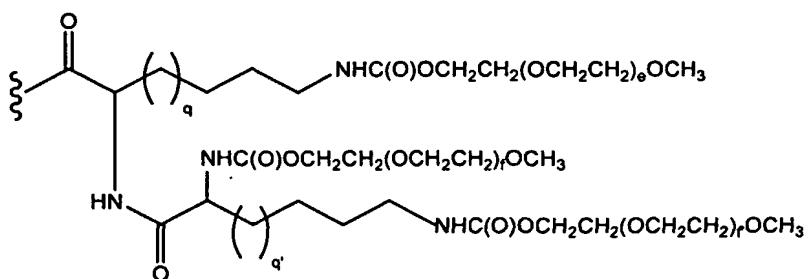
4       wherein

5           e and f are integers independently selected from 1 to 2500; and  
 6           q is an integer from 0 to 20.

1    4.    The peptide according to claim 1, wherein R<sup>1</sup> has a structure that is a member  
 2    selected from:



; and

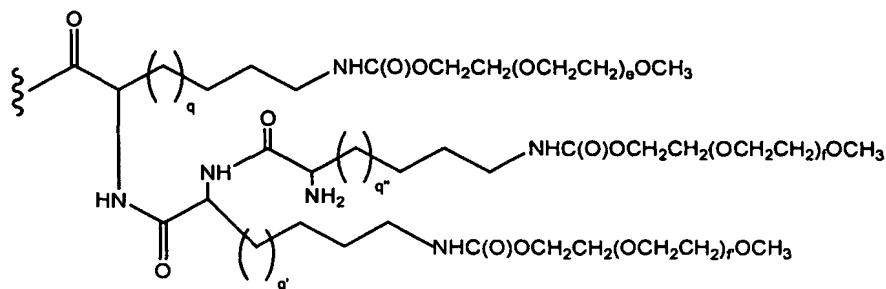


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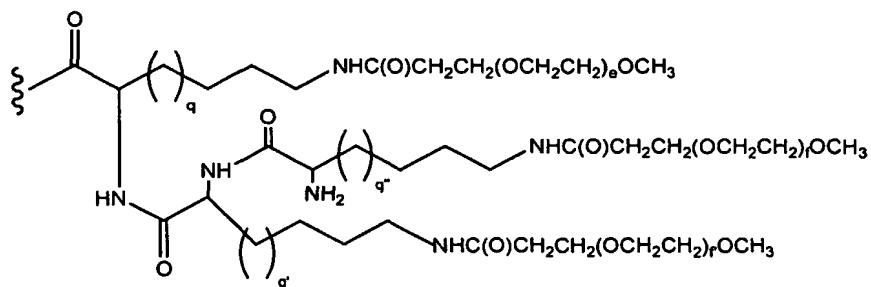
4           wherein

5           e, f and f' are integers independently selected from 1 to 2500; and  
 6           q and q' are integers independently selected from 1 to 20.

1 5. The peptide according to claim 1, wherein R<sup>1</sup> has a structure that is a member  
2 selected from:



and

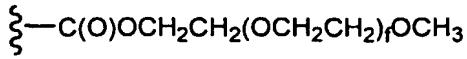
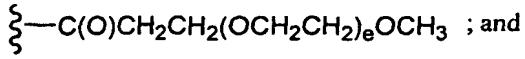


3

4 **wherein**

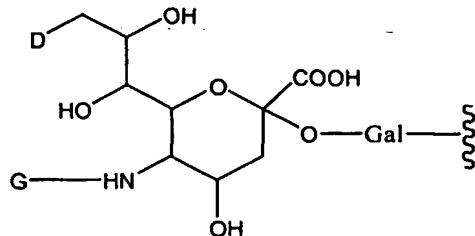
5           e, f and f' are integers independently selected from 1 to 2500; and  
6           q, q' and q'' are integers independently selected from 1 to 20.

1    6.        The peptide according to claim 1, wherein R<sup>1</sup> has a structure that is a member  
2    selected from:

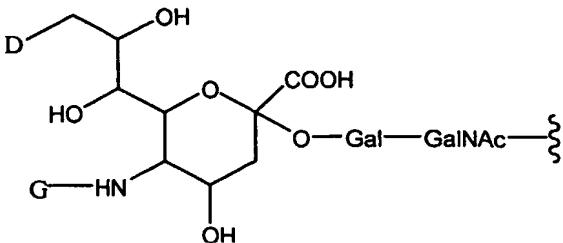


5 e and f are integers independently selected from 1 to 2500.

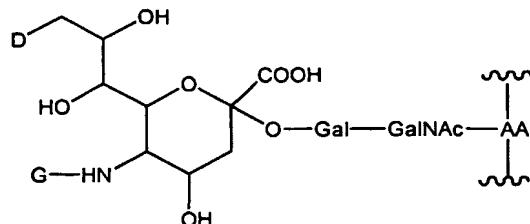
1 7. The G-CSF peptide according to claim 1, wherein said moiety has the  
2 formula:



1    8.    The G-CSF peptide according to claim 1, wherein said moiety has the  
 2    formula:



1    9.    The G-CSF peptide according to claim 1, wherein said moiety has the  
 2    formula:



4    wherein

5            AA is an amino acid residue of said peptide.

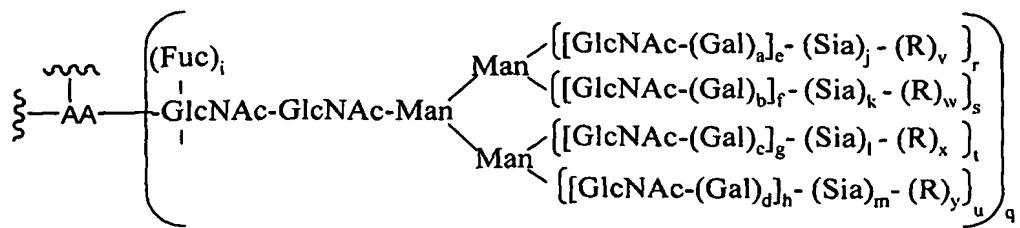
1    10.    The G-CSF peptide according to claim 9, wherein said amino acid residue is a  
 2    member selected from serine or threonine.

1    11.    The G-CSF peptide according to claim 1, wherein said peptide has the amino  
 2    acid sequence of SEQ. ID. NO:1.

1    12.    The G-CSF peptide according to claim 11, wherein said amino acid residue is  
 2    threonine at position 133 of SEQ. ID. NO:1.

1    13.    The peptide according to claim 1, wherein said peptide has an amino acid  
 2    sequence selected from SEQ. ID. NO:1 and SEQ ID NO:2.

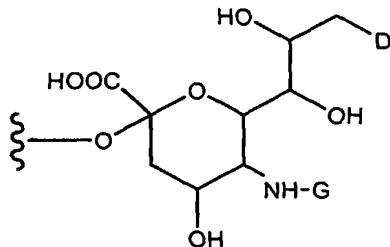
1    14.    The G-CSF peptide according to claim 1, wherein said moiety has the  
 2    formula:



3

4 wherein

5 a, b, c, d, i, r, s, t, and u are integers independently selected from 0 and 1;  
 6 q is 1;  
 7 e, f, g, and h are members independently selected from the integers from 0 to  
 8 6;  
 9 j, k, l, and m are members independently selected from the integers from 0 and  
 10 100;  
 11 v, w, x, and y are independently selected from 0 and 1, and least one of v, w, x  
 12 and y is 1;  
 13 AA is an amino acid residue of said G-CSF peptide;  
 14 Sia-(R) has the formula:



15

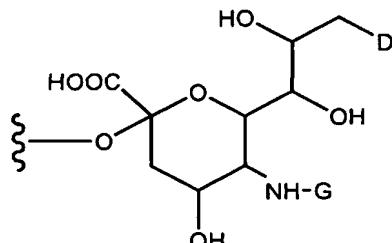
16 wherein

17 D is a member selected from -OH and R<sup>1</sup>-L-HN-;  
 18 G is a member selected from R<sup>1</sup>-L- and -C(O)(C<sub>1</sub>-C<sub>6</sub>)alkyl;  
 19 R<sup>1</sup> is a moiety comprising a member selected a straight-chain or  
 20 branched poly(ethylene glycol) residue; and  
 21 L is a linker which is a member selected from a bond, substituted or  
 22 unsubstituted alkyl and substituted or unsubstituted heteroalkyl,  
 23 such that when D is OH, G is R<sup>1</sup>-L-, and when G is -C(O)(C<sub>1</sub>-C<sub>6</sub>)alkyl,  
 24 D is R<sup>1</sup>-L-NH-.

1   **15.**   The peptide according to claim 14, wherein said amino acid residue is an  
2   asparagine residue.

1   **16.**   The peptide according to claim 1, wherein said peptide is a bioactive  
2   Granulocyte Colony Stimulating Factor peptide.

1   **17.**   A method of making a G-CSF peptide conjugate comprising the moiety:

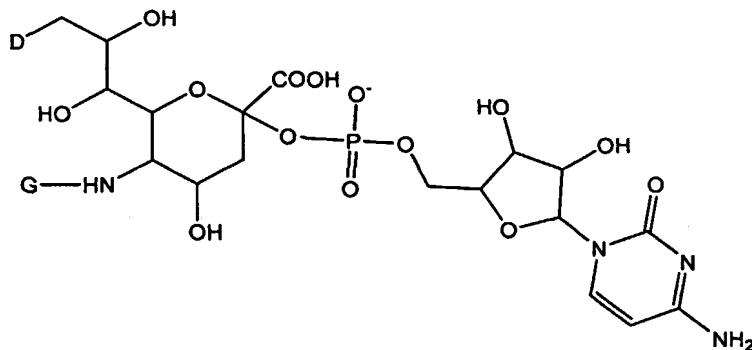


2  
3   wherein

4       D is a member selected from -OH and R<sup>1</sup>-L-HN-;  
5       G is a member selected from R<sup>1</sup>-L- and -C(O)(C<sub>1</sub>-C<sub>6</sub>)alkyl;  
6       R<sup>1</sup> is a moiety comprising a member selected a straight-chain or branched  
7       poly(ethylene glycol) residue; and  
8       L is a linker which is a member selected from a bond, substituted or  
9       unsubstituted alkyl and substituted or unsubstituted heteroalkyl,  
10      such that when D is OH, G is R<sup>1</sup>-L-, and when G is -C(O)(C<sub>1</sub>-C<sub>6</sub>)alkyl, D is  
11      R<sup>1</sup>-L-NH-,

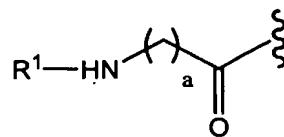
12   said method comprising:

13       (a) contacting a substrate G-CSF peptide with a PEG-sialic acid donor moiety  
14        having the formula:



15  
16      and an enzyme that transfers said PEG-sialic acid onto an amino acid  
17      or glycosyl residue of said G-CSF peptide, under conditions  
18      appropriate for the transfer.

1    18.    The method according to claim 17, wherein L-R<sup>1</sup> has the formula:

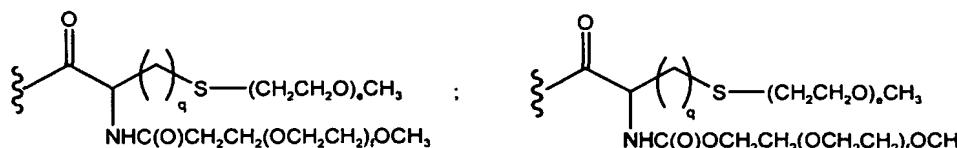


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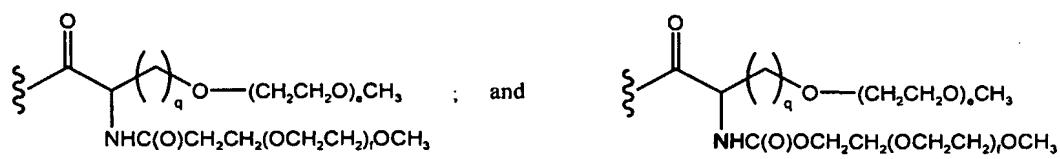
3    wherein

4    a is an integer from 0 to 20.

1    19.    The method according to claim 17, wherein R<sup>1</sup> has a structure that is a  
2    member selected from:



3

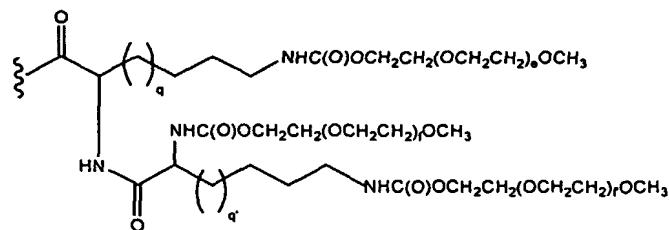
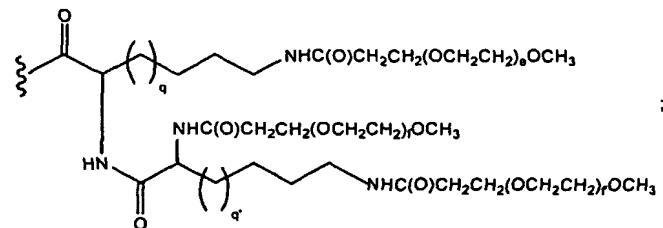
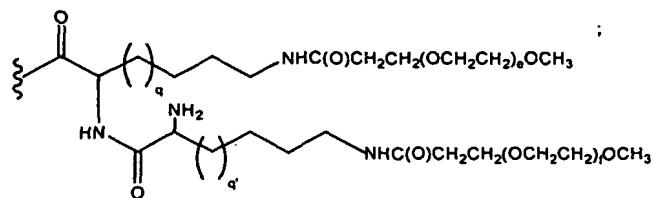
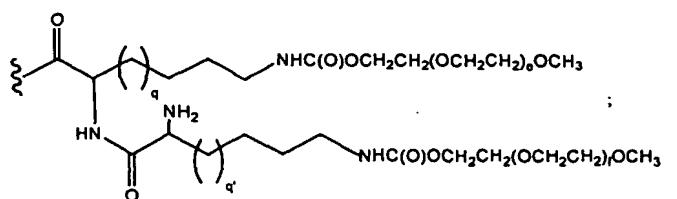


4    wherein

5    e and f are integers independently selected from 1 to 2500; and

6    q is an integer from 0 to 20.

1    20.    The method according to claim 17, wherein R<sup>1</sup> has a structure that is a  
2    member selected from:



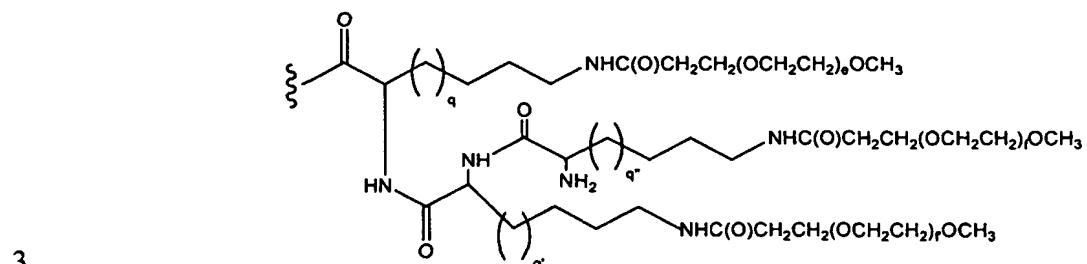
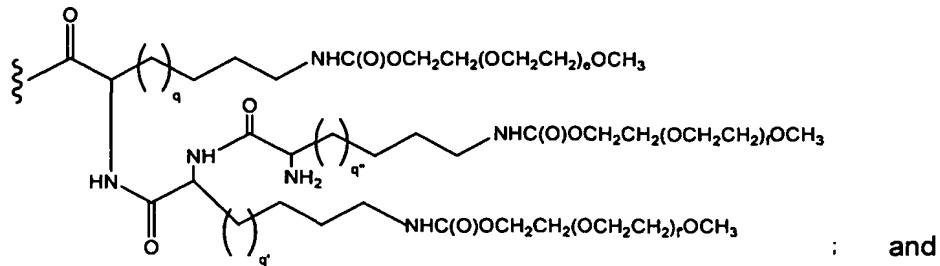
3

4 wherein

5 e, f and f' are integers independently selected from 1 to 2500; and

6 q and q' are integers independently selected from 1 to 20.

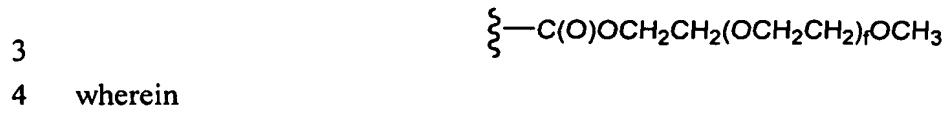
1 21. The method according to claim 17, wherein R<sup>1</sup> has a structure that is a  
 2 member selected from:



3  
 4 wherein

5 e, f and f' are integers independently selected from 1 to 2500; and  
 6 q, q' and q'' are integers independently selected from 1 to 20.

1 22. The method according to claim 17, wherein R<sup>1</sup> has a structure that is a  
 2 member selected from:



5 e and f are integers independently selected from 1 to 2500.

1 23. The method of claim 17, further comprising, prior to step (a):

2 (b) expressing said substrate Granulocyte Colony Stimulating Factor  
 3 peptide in a suitable host.

1 24. The method of claim 17, wherein said host is selected from an insect cell and a  
 2 mammalian cell.

1 25. A method of stimulating inflammatory leukocyte production in a mammal,  
 2 said method comprising administering to said mammal a peptide according to claim 1.

1   **26.**   A method of treating infection in a subject in need thereof, said method  
2   comprising the step of administering to the subject an amount of a peptide according  
3   to claim 1, effective to ameliorate said condition in said subject.

1   **27.**   A pharmaceutical formulation comprising the Granulocyte Colony Stimulating  
2   Factor peptide according to claim 1, and a pharmaceutically acceptable carrier.

1   **28.**   A method of refolding an insoluble recombinant granulocyte colony  
2   stimulating factor (GCSF) protein, the method comprising the steps of:  
3                   (a)   solubilizing the GCSF protein; and  
4                   (b)   contacting the soluble GCSF protein with a buffer comprising a  
5   redox couple to refold the GCSF protein, wherein the refolded GCSF protein is  
6   biologically active.